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CLAIMS

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1.

What is claimed is:

2	identifying a first plurality of regions within a first recursively
3	partitioned/nested geometric structure that correspond to a first plurality of
4	normalized multi-dimensional data of a first normalized multi-dimensional data
5	space, the first recursively partitioned/nested geometric structure being
6	corresponding to the first normalized multi-dimensional data space;
7	determining corresponding first graphing values for said first corresponding
8	regions within said first recursively partitioned/nested geometric structure
9	determined for said first normalized multi-dimensional data of said first normalized
10	multi-dimensional data space;
11	associating corresponding first visual attributes with said first corresponding
12	regions within said first recursively partitioned/nested geometric structure, based at
13	least in part on corresponding ones of said determined first graphing values; and
14	displaying said first recursively partitioned/nested geometric structure, visually
15	differentiating said first corresponding regions based at least in part on
16	corresponding ones of said associated first visual attributes.

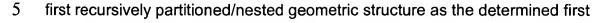
A processor implemented data processing method comprising:

2. The method of claim 1, wherein each of said first normalized multi-dimensional data of said first normalized multi-dimensional data space comprises a plurality of relative coordinate values, and the method further comprises constructing a polynary string to represent each of said first normalized multi-dimensional data and its corresponding one of said first regions within said first recursively



- 6 partitioned/nested geometric structure in accordance with the relative coordinate
- 7 values.
- 1 3. The method of claim 2, wherein said constructing of a polynary string to
- 2 represent each of said first normalized multi-dimensional data and its corresponding
- 3 one of said first regions within said first recursively partitioned/nested geometric
- 4 structure in accordance with the relative coordinate values comprises selecting a
- 5 symbol as the next symbolic member of the polynary string based on which of the
- 6 relative coordinate values is the current highest relative coordinate value.
- 1 4. The method of claim 3, wherein said constructing of a polynary string to
- 2 represent each of said first normalized multi-dimensional data and its corresponding
- 3 one of said first regions within said first recursively partitioned/nested geometric
- 4 structure in accordance with the relative coordinate values further comprises
- 5 reducing the highest relative coordinate value in by an amount (G), upon each
- 6 selection, and reducing the amount (G) after each reduction.
- 1 5. The method of claim 4, wherein the amount (G) initially equals 1 F, and
- 2 thereafter reduced each time by $G^*(1 F)$, where F equals (n 1)/n, and n equals
- 3 the number of relative coordinate values.
- 1 6. The method of claim 2, wherein said determining of corresponding first
- 2 graphic values comprises determining frequencies of occurrence of the various
- 3 polynary strings of said first normalized multi-dimensional data, and assigning the
- 4 determined frequencies of occurrence to the corresponding first regions within the





- 6 graphing values of the corresponding first regions.
- 1 7. The method of claim 1, wherein said determining of corresponding first
- 2 graphic values comprises assigning first output values corresponding to the first
- 3 normalized multi-dimensional data as the determined first graphing values of the
- 4 corresponding first regions within the first recursively partitioned/nested geometric
- 5 structure.
- 1 8. The method of claim 7, wherein said determining of corresponding first
- 2 graphic values further comprises computing said first output values.
- 1 9. The method of claim 8, wherein each of said first normalized multi-
- 2 dimensional data of said first normalized multi-dimensional data space comprises a
- 3 polynary string having a plurality of symbols, encoding a plurality of relative
- 4 coordinate values, and said computing of the first output values comprises
- for each constituting symbols of a polynary string, summing one or more
- 6 appearance values corresponding to one or more appearances of the particular
- 7 symbol in the polynary string, and adding the sum to an average residual relative
- 8 coordinate value.
- 1 10. The method of claim 9, wherein each appearance value corresponding to an
- 2 appearance of a particular symbol is dependent on the position of the particular
- 3 appearance of the particular symbol in the polynary string.

- 1 11. The method of claim 10, wherein each appearance value corresponding to an
- 2 appearance of a particular symbol is equal to a positional value associated with the
- 3 position of the particular appearance in the polynary string.
- 1 12. The method of claim 11, wherein
- 2 each positional value equals to $(1 F) \times F^{**}(k 1)$, and
- 3 the average residual relative coordinate value equals $(1 F) \times F^{**}K$,
- 4 where F equals (n 1)/n,
- 5 k denotes a position in a polynary string,
- 6 n equals the number of relative coordinate values, and
- 7 K equals the length of the polynary string.
 - 13. The method of claim 2, wherein the method further comprises
- 2 receiving a first zooming specification comprising one or more of said
- 3 polynary string constituting symbols;
 - excluding a first subset of said first regions based at least in part on said
- 5 received first zooming specification; and
- 6 repeating said displaying for the remaining ones of said first regions in an
- 7 expanded manner.
- 1 14. The method of claim 13, wherein the method further comprises
- 2 receiving a second zooming specification comprising one or more additional
- 3 ones of said polynary string constituting symbols;
- 4 excluding a second subset of said remaining ones of said first regions based
- 5 at least in part on said received second zooming specification; and
- 6 repeating said displaying for the remaining ones of said first regions.

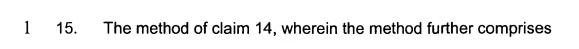
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- restoring the remaining ones of said first regions to re-include said excluded second subset of said first regions; and repeating said displaying for the remaining ones of said first regions.
- 2 receiving an unzoom specification;
- restoring the remaining ones of said first regions to re-include said excluded

The method of claim 13, wherein the method further comprises

- 4 first subset of said first regions; and
- 5 repeating said displaying for said first regions.

receiving an unzoom specification;

- 1 17. The method of claim 1, wherein said associating comprises for each of said
- 2 first regions, associating a selected one of a plurality of symbols with the region
- 3 based at least in part on the determined graphing value of the region.
- 1 18. The method of claim 1, wherein said associating comprises for each of said
- 2 first regions, associating a selected one of a plurality of color attributes with the
- 3 region based at least in part on the determined graphing value of the region.
- 1 19. The method of claim 1, wherein said associating comprises for each of said
- 2 first regions, associating a selected one of a plurality of colored geometric primitives
- 3 with the region based at least in part on the determined graphing value of the region.

variable of the function.

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- 1 20. The method of claim 1, wherein said associating comprises for each of said 2 first regions, associating a selected blending of a plurality of colors with the region 3 based at least in part on contributions to the determined graphing value of the
- 4 region.
- 1 21. The method of claim 1, wherein said first regions correspond to all 2 constituting regions of the first recursively partitioned/nested geometric structure, 3 said first normalized multi-dimensional data are values of independent variables of a 4 function, and said first graphing values are corresponding values of a dependent 5
 - 22. The method of claim 1, wherein the method further comprises identifying a second plurality of regions within a second recursively partitioned/nested geometric structure that correspond to a second plurality of normalized multi-dimensional data of a second normalized multi-dimensional data space, the second recursively partitioned/nested geometric structure being corresponding to the second normalized multi-dimensional data space;

determining corresponding second graphing values for said second corresponding regions within said second recursively partitioned/nested geometric structure determined for said second normalized multi-dimensional data of said second normalized multi-dimensional data space;

associating corresponding second visual attributes with said second corresponding regions within said second recursively partitioned/nested geometric structure, based at least in part on corresponding ones of said determined second graphing values; and

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- displaying said second recursively partitioned/nested geometric structure,
 visually differentiating said second corresponding regions based at least in part on
 corresponding ones of said associated second visual attributes.
- 1 23. The method of claim 22, wherein said first and second recursively
- 2 partitioned/nested geometric structures are displayed in a manner such that both
- 3 recursively partitioned/nested geometric structures are visible concurrently.
- The method of claim 23, wherein each of said first and second normalized multi-dimensional data of said first and second normalized multi-dimensional data spaces comprises a polynary string having a plurality of symbols, encoding a plurality of relative coordinate values, the method further comprises
 - receiving a first zooming specification comprising one or more of said polynary string constituting symbols;
 - excluding a first subset of said first regions based at least in part on said received first zooming specification;
 - excluding a second subset of said second regions based at least part on the removed ones of said first regions; and
- repeating said displaying for the remaining ones of said first and second regions.
 - 1 25. The method of claim 22, wherein said first and second normalized multi-
 - 2 dimensional data are values of first and second input variables.

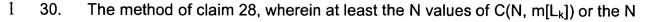
- 3 are values of corresponding output variables.
- 1 27. The method of claim 1, wherein the method further comprises computing a
- 2 location for a centroid for each of a plurality primitive elements of the geometric
- 3 structure.
- 1 28. The method of claim 27, wherein coordinates (x_p, y_p) of the location of each centroid is computed as follows:

2 centroid is computed as follows:
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$$Xp = Xc + R * \sum_{k=1}^{K} V(N,k) * C(N,m[Lk])$$

$$Yp = Yc + R * \sum_{k=1}^{K} V(N,k) * S(N,m[Lk])$$

- 5 where:
- 6 (X_c, Y_c) are coordinate values of the geometric structure's centroid;
- R is a radius extending from the geometric structure's centroid to an outermost vertex of the geometric structure;
- 9 V(N, k) is $w^*(1 w)^{**}(k 1)$ where $w = 1/(1+\sin(\pi/N))$;
- $m[L_k]$ is outer vertex number (1, 2, ..., N) assigned to the kth symbol
- appearing in a corresponding polynary string;
- 12 $C(N, m[L_k]) = cosine(a^* \pi)$; and
- 13 $S(N, m[L_k]) = sine(a^* \pi)$ [where $a = (5^*N 4^*m[L_k])/(2^*N)$].
 - 1 29. The method of claim 28, wherein the K values of V(N, k) are computed once
- 2 responsive to a specification of N.





- 2 values of S(N, m[L_k]) are computed once responsive to a specification of N.
- 1 31. A processor implemented data processing method for generating a polynary
- 2 string representation for an entity defined by n relative coordinate values, n being an
- 3 integer, comprising:
- 4 associating n symbolic representations with said n relative coordinate values;
- 5 and
- 6 selecting the symbolic representation corresponding to the highest relative
- 7 coordinate value as the first constituting member of the polynary string
- 8 representation.
- 1 32. The method of claim 31, wherein the method further comprises
- 2 computing a constant value (F) by dividing (n 1) by n; and
- 3 computing a variable value (G) by subtracting F from 1;
- 4 subtracting G from the current highest relative coordinate value; and
- 5 selecting the symbolic representation corresponding to the current highest
- 6 relative coordinate value as the next constituting member of the polynary string
- 7 representation.
- 1 33. The method of claim 32, wherein the method further comprises
- 2 multiplying the current value of G by F;
- 3 subtracting G from the current highest relative coordinate value; and
- 4 selecting the symbolic representation corresponding to the current highest
- 5 relative coordinate value as the next constituting member of the polynary string
- 6 representation.



- 2 said multiply, subtracting and selecting operations set forth in claim 29.
- 1 35. The method of claim 31, wherein said symbolic representation comprises a
- 2 letter.
- 1 36. The method of claim 31, wherein said symbolic representation comprises a
- 2 special character.
- 1 37. A processor implemented data processing method for generating a relative
- 2 coordinate value for an constituting variable of an entity, the entity being
- 3 represented by a polynary string representation having a plurality of symbolic
- 4 members representing the constituting variables, the method comprising:
- 5 determining appearance positions of appearance instances of the symbolic
- 6 members in said polynary string representation;
- 7 summing positional values corresponding to the appearance instances of the
- 8 symbolic members in said polynary string representation; and
- 9 adding the sum to an average residual relative coordinate value.
- 1 38. The method of claim 37, wherein
- 2 each positional value equals to $(1 F) \times F^{**}(k 1)$, and
- 3 the average residual relative coordinate value equals $(1 F) \times F^{**}K$,
- 4 where F equals (n-1)/n,
- 5 n equals the number of coordinate values,
- 6 k denotes a position in the polynary string representation; and

K equals the length of the polynary string.

	1	39.	An apparatus comprising:
	2		storage medium having stored therein programming instructions designed to
	3	enab	le the apparatus to
	4		identify a first plurality of regions within a first recursively
	5		partitioned/nested geometric structure that correspond to a first
	6		plurality of normalized multi-dimensional data of a first normalized
	7		multi-dimensional data space, the first recursively partitioned/nested
	8		geometric structure being corresponding to the first normalized multi-
	9		dimensional data space,
	10		determine corresponding first graphing values for said first corresponding
	11		regions within said first recursively partitioned/nested geometric
	12		structure determined for said first normalized multi-dimensional data of
	13		said first normalized multi-dimensional data space;
<u> </u>	14		associate corresponding first visual attributes with said first corresponding
4 11-4	15		regions within said first recursively partitioned/nested geometric
ļ. L	16		structure, based at least in part on corresponding ones of said
	17		determined first graphing values, and
	18		display said first recursively partitioned/nested geometric structure,
	19		visually differentiating said first corresponding regions based at least in
	20		part on corresponding ones of said associated first visual attributes;
	21		and
	22		at least one processor coupled to the storage medium to execute the
	23	progr	amming instructions.



- 1 40. The apparatus of claim 39, wherein each of said first normalized multi-
- 2 dimensional data of said first normalized multi-dimensional data space comprises a
- 3 plurality of relative coordinate values, and the programming instructions are further
- 4 designed to enable the apparatus to construct a polynary string to represent each of
- 5 said first normalized multi-dimensional data and its corresponding one of said first
- 6 regions within said first recursively partitioned/nested geometric structure in
- 7 accordance with the relative coordinate values.
- 1 41. The apparatus of claim 40, wherein said programming instructions are
- 2 designed to enable the apparatus to perform said constructing of a polynary string
- 3 by selecting a symbol as the next symbolic member of the polynary string based on
- 4 which of the relative coordinate values is the current highest relative coordinate
- 5 value.
- 1 42. The apparatus of claim 41, wherein said programming instructions are further
- 2 designed to enable the apparatus to perform said constructing of a polynary string
- 3 by reducing the highest relative coordinate value in by an amount (G), upon each
- 4 selection, and reducing the amount (G) after each reduction.
- 1 43. The apparatus of claim 42, wherein said programming instructions are
- 2 designed to enable the apparatus to set the amount (G) initially to 1 F, and
- 3 thereafter reduced each time by $G^*(1 F)$, where F equals (n 1)/n, and n equals
- 4 the number of relative coordinate values.
- 1 44. The apparatus of claim 40, wherein said programming instructions are
- 2 designed to enable the apparatus to perform said determining by determining



3	frequencies of	occurrence of the	various polynary	strings o	f said first	normalized
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- 4 multi-dimensional data, and assigning the determined frequencies of occurrence to
- 5 the corresponding first regions within the first recursively partitioned/nested
- 6 geometric structure as the determined first graphing values of the corresponding first
- 7 regions.
- 1 45. The apparatus of claim 39, wherein said programming instructions are
- 2 designed to enable the apparatus to perform said determining by assigning first
- 3 output values corresponding to the first normalized multi-dimensional data as the
- 4 determined first graphing values of the corresponding first regions within the first
- 5 recursively partitioned/nested geometric structure.
- 1 46. The apparatus of claim 45, wherein said programming instructions are further
- 2 designed to enable the apparatus to perform said determining by computing said
- 3 first output values.
- 1 47. The apparatus of claim 46, wherein each of said first normalized multi-
- 2 dimensional data of said first normalized multi-dimensional data space comprises a
- 3 polynary string having a plurality of symbols, encoding a plurality of relative
- 4 coordinate values, and said programming instructions are designed to enable the
- 5 apparatus to perform said computing by
- 6 summing one or more appearance values corresponding to one or more
- 7 appearances of the particular symbol in a polynary string, and adding the sum to an
- 8 average residual relative coordinate value, and
- 9 repeating said summing and adding for each constituting symbols of the
- 10 polynary string.

- 1 48. The apparatus of claim 47, wherein each appearance value corresponding to
- 2 an appearance of a particular symbol is dependent on the position of the particular
- 3 appearance of the particular symbol in the polynary string.
- 1 49. The apparatus of claim 48, wherein each appearance value corresponding to
- 2 an appearance of a particular symbol is equal to a positional value associated with
- 3 the position of the particular appearance in the polynary string.
- 1 50. The apparatus of claim 49, wherein
- each positional value equals to $(1 F) \times F^{**}(k 1)$, and
- 3 the average residual relative coordinate value equals $(1 F) \times F^{**}K$,
- 4 where F equals (n 1)/n,
- 5 k denotes a position in a polynary string,
- 6 n equals the number of relative coordinate values, and
- 7 K equals the length of the polynary string.
- 1 51. The apparatus of claim 40, wherein said programming instructions are further
- 2 designed to enable the apparatus to
- 3 receive a first zooming specification comprising one or more of said polynary
- 4 string constituting symbols;
- 5 exclude a first subset of said first regions based at least in part on said
- 6 received first zooming specification; and
- 7 repeat said displaying for the remaining ones of said first regions in an
- 8 expanded manner.

1	52.	The apparatus of claim 51, wherein said programming instructions are further	
2	designed to enable the apparatus to		
3		receive a second zooming specification comprising one or more additional	
4	ones	of said polynary string constituting symbols;	
5		exclude a second subset of said remaining ones of said first regions based at	
6	least	in part on said received second zooming specification; and	
7		repeat said displaying for the remaining ones of said first regions.	
1	53.	The apparatus of claim 52, wherein said programming instructions are	
2	designed to enable the apparatus to		
3		receive an unzoom specification;	
4		restore the remaining ones of said first regions to re-include said excluded	
5	secor	nd subset of said first regions; and	
6		repeat said displaying for the remaining ones of said first regions.	
1	54.	The apparatus of claim 51, wherein said programming instructions are further	
2	desig	ned to enable the apparatus to	
3	•	receive an unzoom specification;	
4		restore the remaining ones of said first regions to re-include said excluded	
5	first s	ubset of said first regions; and	

- The apparatus of claim 39, wherein said programming instructions are
 designed to enable the apparatus to perform said associating by associating, for
- 3 each of said first regions, a selected one of a plurality of symbols with the region
- 4 based at least in part on the determined graphing value of the region.

repeat said displaying for said first regions.

- 1 56. The apparatus of claim 39, wherein said programming instructions are
- 2 designed to enable the apparatus to perform said associating by associating, for
- 3 each of said first regions, a selected one of a plurality of color attributes with the
- 4 region based at least in part on the determined graphing value of the region.
- 1 57. The apparatus of claim 39, wherein said programming instructions are
- 2 designed to enable the apparatus to perform said associating by associating, for
- 3 each of said first regions, a selected one of a plurality of colored geometric
- 4 primitives with the region based at least in part on the determined graphing value of
- 5 the region.
- 1 58. The apparatus of claim 39, wherein said programming instructions are
- 2 designed to enable the apparatus to perform said associating by associating, for
- 3 each of said first regions, a selected blending of a plurality of colors with the region
- 4 based at least in part on contributions to the determined graphing value of the
- 5 region.
- 1 59. The apparatus of claim 39, wherein said first regions correspond to all
- 2 constituting regions of the first recursively partitioned/nested geometric structure,
- 3 said first normalized multi-dimensional data are values of independent variables of a
- 4 function, and said first graphing values are corresponding values of a dependent
- 5 variable of the function.
- 1 60. The apparatus of claim 39, wherein said programming instructions are further
- 2 designed to enable the apparatus to

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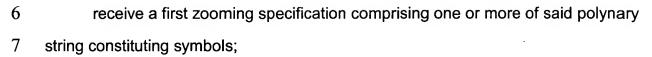
3	identify a second plurality of regions within a second recursively
4	partitioned/nested geometric structure that correspond to a second plurality of
5	normalized multi-dimensional data of a second normalized multi-dimensional data
5	space, the second recursively partitioned/nested geometric structure being
7	corresponding to the second normalized multi-dimensional data space;
3	determine corresponding second graphing values for said second
9	corresponding regions within said second recursively partitioned/nested geometric

structure determined for said second normalized multi-dimensional data of said second normalized multi-dimensional data space;

associate corresponding second visual attributes with said second corresponding regions within said second recursively partitioned/nested geometric structure, based at least in part on corresponding ones of said determined second graphing values; and

display said second recursively partitioned/nested geometric structure, visually differentiating said second corresponding regions based at least in part on corresponding ones of said associated second visual attributes.

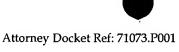
- 61. The apparatus of claim 60, wherein said first and second recursively partitioned/nested geometric structures are displayed in a manner such that both recursively partitioned/nested geometric structures are visible concurrently.
- 62. The apparatus of claim 61, wherein each of said first and second normalized multi-dimensional data of said first and second normalized multi-dimensional data
- 3 spaces comprises a polynary string having a plurality of symbols, encoding a
- 4 plurality of relative coordinate values, said programming instructions are further
- 5 designed to enable the apparatus to



- exclude a first subset of said first regions based at least in part on said received first zooming specification;
- exclude a second subset of said second regions based at least part on the removed ones of said first regions; and
- repeat said displaying for the remaining ones of said first and second regions.
- 1 63. The apparatus of claim 60, wherein said first and second normalized multi-2 dimensional data are values of first and second input variables.
- 1 64. The apparatus of claim 60, wherein said first normalized multi-dimensional
- 2 data are values of input variables, and said second normalized multi-dimensional
- 3 data are values of corresponding output variables.
- 1 65. The apparatus of claim 39, wherein said apparatus is a selected one of a
- 2 palm sized processor based device, a notebook computer, a desktop computer, a
- 3 set-top box, a single processor server, a multi-processor server, and a collection of
- 4 coupled servers.
- 1 66. The apparatus of claim 37, wherein said programming instructions are further
- 2 designed to compute a location for a centroid for each of a plurality of primitive
- 3 elements of the geometric structure.
- 1 67. The apparatus of claim 66, wherein said programming instructions are
- 2 designed to compute coordinates (x_p, y_p) of the location of each centroid as follows:

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$$Yp = Yc + R * \sum_{k=1}^{K} V(N,k) * S(N,m[Lk])$$

- 5 where:
- 6 (X_{c,} Y_c) are coordinate values of the geometric structure's centroid;
- 7 R is a radius extending from the geometric structure's centroid to an
- 8 outermost vertex of the geometric structure;
- 9 V(N, k) is $w^*(1 w)^{**}(k 1)$ where $w = 1/(1+\sin(\pi/N))$;
- $m[L_k]$ is outer vertex number (1, 2, ..., N) assigned to the kth symbol
- appearing in a corresponding polynary string;
- 12 $C(N, m[L_k]) = cosine(a^* \pi);$ and
- 13 $S(N, m[L_k]) = sine(a^* \pi) [where a = (5^*N 4^*m[L_k])/(2^*N)].$
 - 1 68. The apparatus of claim 67, wherein said programming instructions are
- designed to compute the K values of V(N, k) once responsive to a specification of N.
- 1 69. The method of claim 67, wherein said programming instructions are designed
- 2 to compute at least the N values of $C(N, m[L_k])$ or the N values of $S(N, m[L_k])$ once
- 3 responsive to a specification of N.
- 1 70. An apparatus comprising
- 2 storage medium having stored therein programming instructions designed to
- 3 enable the apparatus to
- 4 associate n symbolic representations with said n relative coordinate
- 5 values, and



6	select the symbolic representation corresponding to the highest		
7	relative coordinate value as the first constituting member of the		
8	polynary string representation; and		
9	at least one processor coupled to the storage medium to execute the		
10	programming instructions.		
1	71. The apparatus of claim 70, wherein the programming instructions further		
2	enable the apparatus to		
3	compute a constant value (F) by dividing $(n - 1)$ by n; and		
4	compute a variable value (G) by subtracting F from 1;		
5	subtract G from the current highest relative coordinate value; and		
6	select the symbolic representation corresponding to the current highest		
7	relative coordinate value as the next constituting member of the polynary string		
8	representation.		
1	72. The apparatus of claim 71, wherein the programming instructions further		
2	enable the apparatus to		
3	multiply the current value of G by F;		
4	subtract G from the current highest relative coordinate value; and		
5	select the symbolic representation corresponding to the current highest		
6	relative coordinate value as the next constituting member of the polynary string		
7	representation.		
1	73. The apparatus of claim 72, wherein the programming instructions further		
2	enable the apparatus to repeat said multiply, subtracting and selecting operations		
3	set forth in claim 64.		



1	74.	The apparatus of claim 70, wherein said symbolic representation comprises a	
2	letter		
1	75.	The apparatus of claim 70, wherein said symbolic representation comprises a	
2	spec	ial character.	
1	76.	The apparatus of claim 70, wherein said apparatus is a selected one of a	
2	palm sized processor based device, a notebook computer, a desktop computer, a		
3	set-top box, a single processor server, a multi-processor server, and a collection of		
4	coupled servers.		
1	77.	An apparatus comprising:	
2		storage medium having stored therein a plurality of programming instructions	
3	desig	ned to enable the apparatus to	
4		determine appearance positions of appearance instances of symbolic	
5		members of a polynary string representation of an entity having a	
6		number of constituting variables, the symbolic members being	
7		corresponding to the constituting variables,	
8		sum positional values corresponding to the appearance instances of the	
9		symbolic members in said polynary string representation, and	
10		add the sum to an average residual relative coordinate value; and	
11		at least one processor coupled to the storage medium to execute the	
12	progr	ramming instructions.	

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- 2 each positional value equals to $(1 F) \times F^{**}(k 1)$; and
- 3 the average residual relative coordinate value equals $(1 F) \times F^{**}K$,
- 4 where F equals (n-1)/n,
- n equals the number of coordinate values,
- 6 k denotes a position in the polynary string representation; and
- 7 K denotes the length of the polynary string.
- 1 79. The apparatus of claim 77, wherein said apparatus is a selected one of a
- 2 palm sized processor based device, a notebook computer, a desktop computer, a
- 3 set-top box, a single processor server, a multi-processor server, and a collection of
- 4 coupled servers.